From:	Michael Rozengurt
To:	Vinton, Joanne@DeltaCouncil
Subject:	truth
Date:	Saturday, February 18, 2012 8:35:56 PM
Attachments:	Scan Board.pdf Scan Board1.pdf

Charming Joanne,

I send you INFO about the second report that may be left in UC Berkley, Water Resources Library, and in USF Library.

Problem is very simple, namely: some people had been horrified by their content .That is why they managed to "kill" two reports: 1. About runoff and 2. Runoffs and fishery and standards.

So if you want make investigation and get them – be my friend!! Both reports had very positive evaluations; Marine County was a sponsor, about $3 - 4 000 000.00 for two years.

I am not sure if I send you some letters to Governors? Let me know if you wish to get them.

Sincerely,

M .Rozengurt ,P.H., PH.D.

San Francisco State University News Bureau
1600 Holloway Avenue • San Francisco 94132 • 415/338-1665 • New Adm. 467

#56
Contact: Rol Risska

November 19, 1987
FOR IMMEDIATE RELEASE

**SAN FRANCISCO STATE SCIENTISTS TO TESTIFY AT WATER HEARINGS:
HEALTH OF BAY FISHERIES SERIOUSLY THREATENED BY WATER DIVERSION**

Excessive water withdrawals during the past decade have significantly reduced annual river and delta discharges into San Francisco Bay resulting in economic losses of $2.6 billion due to declines in catch of striped bass, salmon and steelhead trout between 1965-86.

These water withdrawals--coupled with very low natural flows during extreme drought years such as 1976-77--have contributed greatly to the serious deterioration of the Bay's resources--especially its fish life.

"The Role of Water Diversions in the Decline of Fisheries of the Delta-San Francisco Bay and Other Estuaries," a technical report based on the previous work of San Francisco State scientists Michael Rozengurt, Michael Herz and Sergio Feld of the University's Paul F. Romberg Tiburon Center for Environmental Studies, will be the basis for testimony to be given during the fresh water inflow portion of the State Water Control Board Bay-Delta Water Rights Hearings beginning Nov. 23 and continuing through Dec. 1 at the Contra Costa Water District Offices in Concord. Rozengurt and Herz will testify.

Their work investigates the modification of fresh water inflow to the Delta and Bay which has occurred since the completion of the Central Valley and State Water Projects. It compares annual commercial and recreational catches of salmon, striped bass and shad, primarily during the pre-project period, with flows several years earlier. A key premise of the research is that flow has the greatest impact during the first seasons of an organism's life.

Results of the study reveal very high correlations between catch and annual and especially spring flows during the previous three to five years, and indicate the quantities of flow required to support optimal fish catches.

Despite the more than $2 billion spent over the past 25 years on the evaluation and management of the Delta-San Francisco Bay ecosystem, the basic understanding necessary to preserve its health has not been achieved, the report states. Without a clear picture of the complex factors that influence the Delta and Bay living resources and water quality, management decisions have been unable to reverse the decline of resources.

—more—

The Romberg Center research has focused on (1) providing in-depth evaluation of fresh water inflow to the Delta and Bay, (2) assessing the manner in which flow has been modified since the early part of this century (especially during the period following the completion of the major components of the Central Valley Project (CVP) and State Water Project (SWP), and (3) assessing the impacts of flow modification on the fishery resources of the system.

The focus of their most recent research is to use the results of the previous investigation on the modification of fresh water flow to the Delta and Bay to analyze the relationship between flow and commercial and recreational fish catches, especially striped bass.

The 304-page report includes sections on the relationship between fish catch and fresh water flow in estuaries and coastal zones, factors affecting salmon, striped bass and shad populations, and the relationship between flow fluctuations and the commercial and recreational catch of salmon, striped bass and shad.

The research emphasizes that the losses in water supply sustained by the river-Delta-Bay ecosystem results in losses, in millions of tons, of the organic and inorganic matter required to provide adequate ecological conditions for fish life.

Based on their findings, the scientists' report makes recommendations for water standards and criteria to safeguard fisheries' resources. The report also suggests a new type of water classification system which addresses not only water withdrawal needs but also the needs of the entire San Francisco Bay. Such a new system would better safeguard the river-Delta-Bay ecosystem, the scientists maintain.

-30-

Editors: Michael Rozengurt and Michael Herz, co-editors of the report, are available for further comment. Copies of the report are available from the Romberg Tiburon Center: 415/435-1717, or contact the San Francisco State University Office of Public Affairs for assistance.

The Agonizing San Francisco Bay Ecosystem

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Abstract

Cumulative effects of the impoundment and inland water diversions of millions of acre-feet from the San Francisco Bay watershed have resulted in chronic depletion of spring runoff ranging from –75% to 90% and up to 70% of annual runoffs, as opposed to a natural predominant deviation only ± 25% to ±30% of the perennial norm (flows averaged over 50 - 55 years). As a result, there has been an anomalous frequency of occurrence of subnormal wetness, regardless of values of natural runoffs for the last 25 years has occurred. The excessive spring water withdrawals, compounded by the late winter water diversions, have significantly reduced annual river and Delta discharges and contributed greatly to the deterioration of the resources of the system and impeded the continuum and functioning of Sacramento -San Joaquin Rivers - San Francisco Bay vital to its survival of that of the adjacent coastal sea. This has triggered an accumulation of entropy whose visible indicators are: sluggish circulation, increased detention time of self-purification of the Delta – Bay ecosystem from natural and man-induced pollutants, salt intrusion into the delta, loss of millions of tons of the major biogenic nutrients and oxygen. All these events cumulatively have adversely affected species diversity, migration patterns, and spawning. This has caused a precipitous decline of commercial and recreational catches of anadromous and catadromous fish and shellfish.

Despite the more than $2 billion spent over the past twenty-five years on the evaluation and management of the Delta-San Francisco Bay ecosystem, the basic understanding necessary to preserve its health has not been achieved. Voluntaristic planning of water development has excluded from consideration stochastic laws of runoff's variance and natural tendency of its limitations by climatological and geophysical properties of watershed. Two major failures have exacerbated the detrimental effects of excessive cumulative impoundment of the Bay watershed, namely: (1) water development was and is planned based on Four River Index (Sacramento River basin), although the Delta and Bay were shaped in combination with the San Joaquin river basin for thousands of years. But current requirements of these ecosystems for fresh water were entitled far too low, and (2) the Laws of Thermodynamics in the application to the Delta - Bay system have been ignored as well as tolerance and limitations of ecosystems to diversions beyond which entropy tends to reach maximum. As such, despoliation of the Delta - San Francisco Bay and adjacent coastal ecosystem has occurred. Despite that fact water management is planning to withdraw even more water to produce a mesophytic agricultural

environment in a semi- desert region. With respect to the fish, this effort is obviously beyond the range of tolerance and lead to irreversible effects on the Delta - San Francisco Bay environment. (The magnitude of these diversions, which encompassed nearly 60 years is discussed in great details in Rozengurt et al., 1987a,b).

Introduction to the river-coastal sea continuum

Historically, unobstructed runoffs and its exchange with estuaries, and adjacent coastal seas (for example, the San Francisco Bay and Gulf of Mexico estuaries, and others) maintained their rather intricate, quasi-equilibrium mechanism and rates of their interaction during seasons and years. Therefore, it is logical to expect that the predominant ranges of unimpaired runoff are responsible for developing in the San Francisco Bay of four major, estuarine regime-sustaining features, namely: (1) ecological continuum of the river into adjacent, coastal sea; (2) predominance stochastic variables of rivers' flows from entirely watersheds; (3) a quasi-dynamic equilibrium of the Bay; and (4) limited biochemical resilience and tolerance of the Delta - Bay ecosystem's biota against prolonged disturbances, especially man-induced droughts (due to dewatering). The following is a brief explanation of these properties:

First. The Bay (estuary) may be conceptually perceived as an evolving ecological continuum of two rivers into an adjacent coastal sea that maintain foremost by renewable, but limited runoff. At any given time, the kinematic energy of runoff tends to preserve the estuary through the balancing exchange of a certain ratio of properties of fresh, brackish, and marine water masses (Table). In general, unimpaired interaction of fresh, brackish, and marine water masses sustained the balanced exchange of deltaic and estuarine properties. These processes maintained specific continuum of five interactive zones (Venice International Classification, 1958): delta, avant-delta, intermediate, brackish, and salty water. Each zone is defined by increasing ranges of salinity from fresh to marine water. This natural interaction, typical for any estuaries, particularly during the late winter - spring flooding, determines for year(s) the Bay's richness, vitality, and survival.

Second. The distribution of precipitation (snow and rainfall) over watersheds coupled with climatological properties determines the monthly, seasonal, and annual runoff fluctuations whose volumes are the core for stochastic analysis and the classifications of wetness of a year. Current planning of water distribution among different users in California is based on a water year-type classification called the Four-River Index (**FRI**, the sum of unimpaired runoff of the four major rivers in the Sacramento River basin) whose a perennial **FRI*** = **17.2** MAF; 1921-1978). But the **FRI*** accounts for only 61% of the average of the combined Sacramento - San Joaquin River inflow to the Delta, while the norm of natural rivers' watersheds inflow for the same period was equal, **NRI** = **28.2** MAF (Rozengurt, 1987a).

The **FRI** data base not only overlooks 25% and 100% of the Sacramento and San Joaquin river watersheds' rivers and streams, respectively, but also disregards the historical fact, namely, that San Francisco Bay geomorphological and hydrological features were molded for thousand years by blended runoffs from both. But in our case: **NRI - FRI = 9.0 MAF/yr.?** The question remains, where on the Earth vanished from water balance calculation of the Bay ecosystem this stupendous amount of water? Note that according to Stochastic hydrology, the analyses of perennial runoff behavior must be performed on the basis of 100% accumulating area of two river watersheds (Rozengurt, 1999). Therefore, the evaluation frequency of occurrence of years of different wetness, their classification and subsequent planning for water diversions, grounded on the **FRI** data base, overestimates water availability in a manner incompatible with science of hydrology or the relatively meager natural runoff **(Figure 1)**. It follows that in normal and especially in sub-normal and dry years, or droughts, the **FRI** classification system influences decision-makers towards permitting higher diversions (and potentially irreparably damaging the Delta and Bay ecosystems).

Third. The frictional drag of river runoff, especially during flooding, is responsible for the seaward entrainment of volumes of estuarine waters up to 10 to 100 times greater than that of the runoff itself. The higher the unimpaired runoff, the more energy output, the stronger entrainment, vertical turbulence, mixing, and diminishing the extremes of salt intrusion and other pollutants. As such, the alteration of the potential ---> kinematic energy input/output of runoff exerts a substantial pressure on estuarine and coastal circulation (seen as a river plume and coastal hydrofront, the tint demarcation line, separating brackish and marine waters). This natural phenomenon tends to maintain a quasi-dynamic equilibrium between the Delta, Bay, and adjacent coastal zone (no diversions) suitable for the delta fresh water intakes and estuarine-dependent biota. But when this balanced coexistence has begun to falter, due to the excessive spring diversions, then long-term cumulative energy depletion occurred at an amount relatively equal to the unused energy trapped behind the dams and in water conveyance facilities. This has brought about an accumulation of entropy in the Delta and San Francisco Bay that led to their gradual despoliation (Rozengurt, 1994, 1999; Rozengurt and Hedgpeth, 1998).

It is ironic that the industrial progress forces this ecosystem to "run on entropy". This characteristic is a relative measure of unavailable amount of energy, i.e. the energy that is not capable of performing any work because this water is bound up in reservoirs. In this case, entropy gradually increases in inverse proportion to the available energy in river flow. It tends to reach its cumulative maximum in the progressive depletion of runoff. Paraphrasing the words of the Nobel Prize winning chemist, Frederick Soddy, entropy controls and determines the progression or regression of ecological, societal, and economic infrastructure, and the entire welfare of mankind. This is why costly "restoration" projects (e.g., insignificant sanitary releases from dams in spring, or millions of fry released from hatcheries) have not been effective.

Fourth. There are many intimate links between living and non-living resources and hydrophysical and chemical elements of runoff. It is the fresh water that forged and strengthened the critical link between rivers and coastal seas over the past several thousand years. Estuarine resilience, tolerance, and biological self-adjustment and flourishing depend from an established range(s) of unimpaired flow fluctuations of the highest frequency of occurrence during of any month or season. Despite strong physiological mechanisms to ensure survival and the highest biological productivity, even hardy estuarine living species have tolerance limits to prolonged exposure to extreme conditions, particularly of those caused directly or indirectly by **dams, diversions, dewatering, deforestation**, and **desertification -** the **5 Ds** (Rozengurt, 1993, 1999). In addition, conversion of marshes and wetlands to cropland has exacerbated the denudation of tributaries and desertification of deltaic islands and banks. The direct origin of the five "Ds" is related to misguided rationale behind erroneous doctrines, which were exceptionally popular in a former Soviet Union, especially among the communist party's unscrupulous water developers.

There were four major doctrines: (1) a single-minded mentality, 'Build the network of the distribution of water resources first and see what happens', and 'Not one drop of fresh water wasted into the sea'; (2) the multiple exploitation of watersheds based on purely political and/or economic grounds, considering surface (river) and ground water runoffs inexhaustible; (3) Deltas should be cost- effectively transformed into plumbing conduits (like the Peripheral Canal built on the Volga Delta (Rozengurt and Hedgpeth, 1989) or other inner Delta water conveyance facilities for local and long distance water users; ignoring the impact of hydrotechnical network on the Delta environment as being of limited significance and any negative development, say, levee's erosion, can be prevented by sand replenishment; (4) balanced optimization alternatives of watershed development and preservation of river continuum not given equal weight in any stage of planning impoundment.

These doctrines ignore the rules of Stochastic Hydrology and the postulates of Laws of Thermodynamics. Therefore, water management underestimated the role of river runoff, and its cumulative losses of hundreds of millions of acre-feet (km^3) of freshwater and its constituents led to irrevocable despoliation of coastal ecosystems seen today (Halim, 1991; Rozengurt, 1991,1992; Rozengurt and Haydock, 1993, 1994, 1999; Zaitsev, 1998). Note that this author had forecast in a 1980 letter to California Governor J. Brown, with copies sent to many other politicians, scientists and bureaucrats (Rozengurt and Haydock, 1980), that if water withdrawals on the level 1977- 1980 persisted, it would only take a decade or less to arrive at the gradual degeneration of the Delta - Bay ecosystem into a basin of questionable water quality and biological productivity. The same subject was discussed in other works (Rozengurt and Haydock, 1981; Rozengurt and Herz, 1981; Rozengurt et. al., 1985; Rozengurt at al., 1987 a, b) and in my most recent statement (Rozengurt, 1998) on CalFed's EIS/EIR future planning document (CalFed Ecosystem Restoration Plan (ERPP) Review, Vols. I, II, III, 1997)

The physical laws for any type of estuary for mean sea level can be described by simple equations of conservation mass and energy (Table 1). As follows from Table 1, the increment of salinity ± $\mathbf{S_1^*}$ and ± $\mathbf{S_E}$ may fluctuate as long as water withdrawals continue, but when the diversion at the certain value is stopped then the new salinity of the estuary $\mathbf{S_E^*}$, estuarine outflow $\mathbf{S_1^*}$, and sea inflow $\mathbf{S_2^*}$ (eq. 8-11) will tend to reach their quasi-dynamic equilibrium in a period of several years. However, if diversion starts all over again, the whole process of salt pollution of the delta and upper estuary will be reinforced on a much higher scale. Notably, the estuary's salinity may become even slightly higher than the adjacent coastal area (eq.12). As a result, the delta will cease to exist and it will be transformed into a salty swamp. Therefore, an extremely complex process of salinization of delta-estuary over years is linked to both the impoundment and cumulative losses of hundreds millions of acre-feet water (or hundreds of km^3).

There is ample evidence that cumulative water withdrawals of about 600 MAF (720 km^3) from the San Francisco Bay major rivers - Sacramento and San Joaquin (since the 1930s and 1910s, respectively) led to catastrophic encroachment of brackish water into the Delta. In addition, the depletion of semi-anadromous and anadromous fish catches has occurred, leaving merely 1% of that of the pre-period of construction of hundreds of large and small dams. Suffice to say, the same is typical for the Black-Azov Sea basin whose irrevocable irrigation water withdrawals account for nearly 1,700 km^3 (three times the Sea of Azov's volume); the Caspian Sea 1000-1,200 km^3 (equals North Caspian's volume). At the same time, the landlocked Aral Sea ceased to exist due to immense withdrawals of runoff from two major rivers of Central Asia - Amu Darya/Syr Darya (water deficit now 1,300 -1,400 km^3).

The significance of this development has not been appropriately recognized or appreciated by CalFed as well of some scientific communities. Over 20 years ago it was determined for the Sacramento - San Joaquin rivers (Rozengurt and Herz, 1981; Rozengurt and Haydock, 1981) that a spring runoff maintained at only one to three million acre-feet would take the Bay-Delta functioning to the brink. Unfortunately, California's water management appears to be as callous now as then (Rozengurt, et al. 1985, 1987 a, b). Therefore, today, the San Francisco Bay-Delta ecosystem continues to be subjected to immense economic and ecological penalties similar to that documented in south, semi-arid regions of the Black, Azov, and Caspian seas' watersheds in the former U.S.S.R. (Rozengurt and Hedgpeth, 1989; Zaitsev, 1998). Further examples are: Snake River/Columbia River and its coastal zone; Florida's "Everglades", and Florida, Tampa, and Charlotte bays; the Nile River Delta; some 40 estuaries of the Gulf of Mexico, especially several in Texas; and the Chesapeake Bay (Halim, 1991; Simenstad et al., 1992; Rozengurt and Haydock , 1991, 1993). All attempts to restore fisheries have failed - the current habitats have nothing in common with their teeming past.

Conclusion

Large-scale impoundment of the Sacramento and San Joaquin rivers' watersheds during 1930s to the 1950s has undermined unique features of river continuum into the Delta – Estuary (San Francisco Bay) and coastal sea. This has significantly hampered the ability to maintain ecological continuity suitable for indigenous living resources. The residual runoffs are usually in disconcert, either singly or simultaneously, with water demands for fish migration and spawning versus power production and irrigation in Spring - the most vital period of the year. Undoubtedly, this new, acutely negative phenomenon eliminated alternate historical probabilities and duration of years of different wetness. With time, these non-equilibrium conditions imposed deleterious changes on the ecosystem. Their cumulative dewatering triggered landward salt intrusion from the San Francisco Bay that contaminated the Delta water body as well as ground water tables. Salt water invasion also fortifies abnormal, vertical density stratification leading to oxygen depletion and subsequent mass mortality of vegetation and living organisms.

Sacramento - San Joaquin rivers unimpaired runoff to the Delta - San Francisco Bay over a perennial period (60 years), without dams, would have shown the annual average norm of 28.2 MAF. But due to the significant impoundment, this historical amount has dwindled to the average range of 2 to 12 MAF for years of different wetness (except rarely observed, historically wet years). Spring runoff, the lifeblood of the natural Delta and Bay, has already dropped to 8% to 27% of what once was a norm of 11 MAF.

The frequencies and absolute values of spring and annual deviations reach up to 40 to 85% (instead ± 25 - 30% of norms of unimpaired runoff). Since the 1960s the frequency of occurrence of years of dry, critical dry or drought-like conditions (particularly in spring) have increased 3 to 5 times in comparison with unimpaired runoff over 55 to 100 years. Ensuing perennial water deficits have plagued river flushing and coastal rejuvenation and have become chronic events of nearly global proportion. Since 1955, due to excessive water withdrawals, the Bay has 'lost' over 600 MAF (720 km^3) of freshwater runoff or nearly 100 times its volume, and nearly 500 times that of the Delta; along with millions of tons of organic and inorganic matter, sediment, oxygen, and etc., left behind in reservoirs and in water conveyance facilities. Today, the volumes of regulated inflows/outflows to the Bay often correspond to critical dry years or droughts from the perspective of the functioning of ecosystems without dams. This systemic regime aggravation, compounded by abnormal seasonal redistribution of the **RDO** (regulated Delta outflow) has virtually eliminated striped bass and smelt, and impeded migration and spawning of salmon and other living resources of the Delta - San Francisco Bay.

In my view, any statement claiming that it is possible to attain some level of fish population based on questionable amount of spring runoffs less than **3 MAF** should be considered erroneous. According to correlograms of anadromous fish vs. seasonal and annual runoffs for several preceding years

(**Figure 2**), the only way to reach a historical fish diversity and numbers, one must mimic an historical seasonal distribution. Otherwise, according to the Second Law of Thermodynamics, the current Delta and San Francisco Bay water policies are precarious and eventually lead to accumulation of entropy that signal the end of the agony for the Delta - San Francisco Bay system.

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g. 1. Comparison of Combined Sacramento-San Joaquin River Inflow and 4-River
dex Water Year-Type Classification Systems (% = Probability of Occurrence)

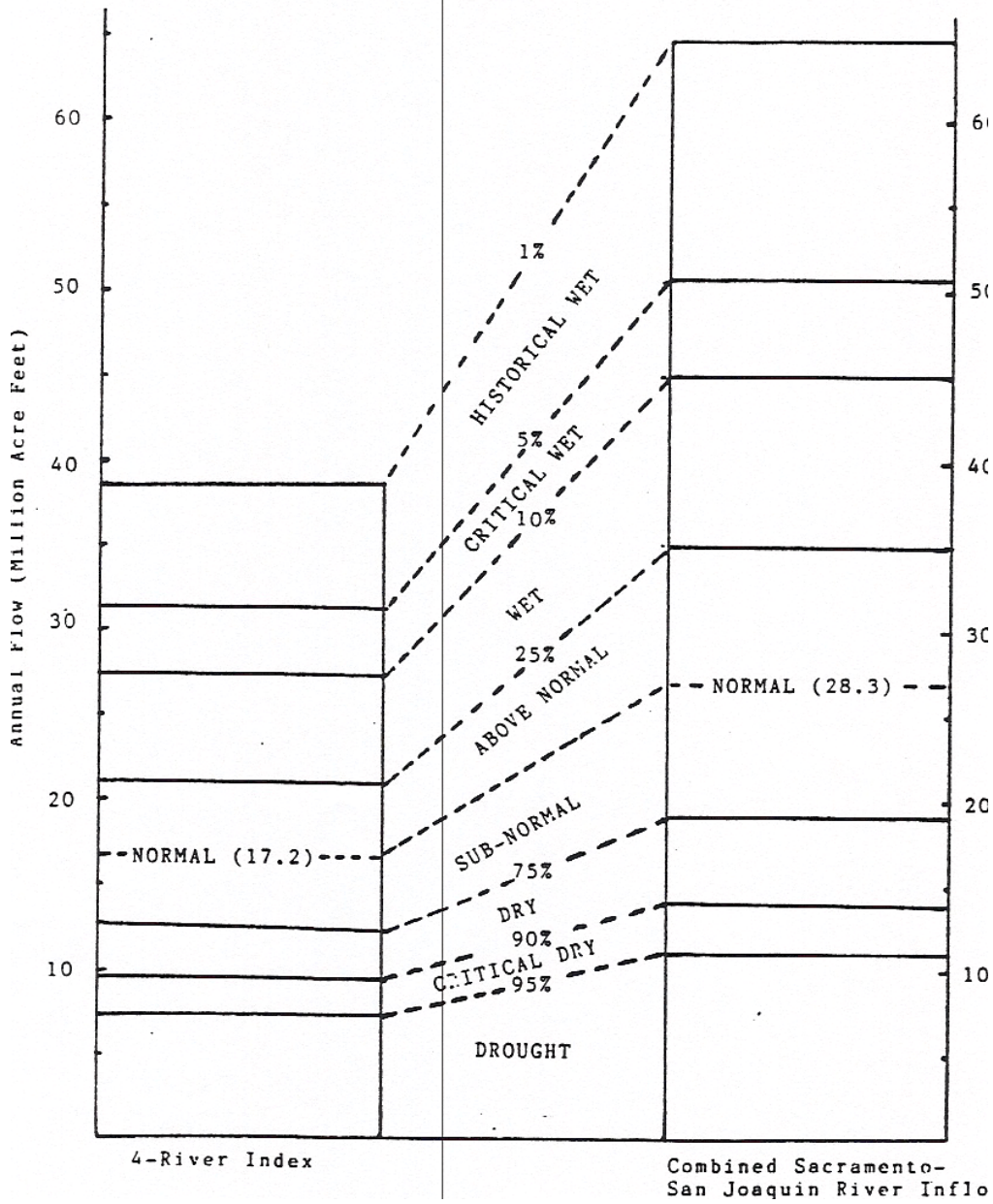
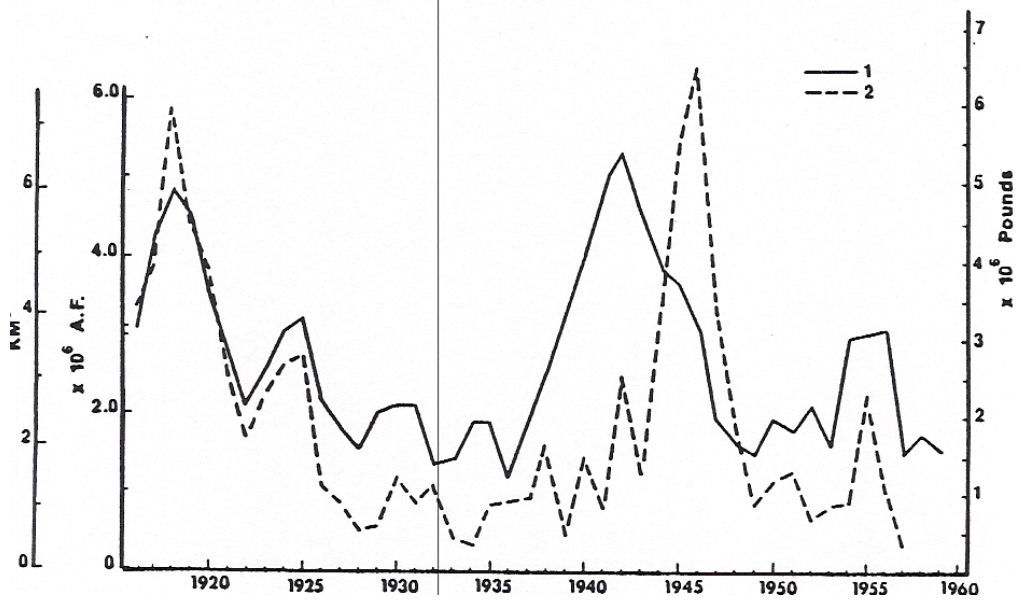


Table 1. THE ELEMENTS OF WATER AND SALT BALANCE OF RIVER-SAN FRANCISCO BAY (ESTUARY)-COASTAL ECOSYSTEMS

$W_1 S_1 = W_2 S_2$	**(1)**	Where: **P** - precipitation; **R** - runoff, **E**- evaporation; **N**- balance;
where $W_1 = (P+R)-E+W_2$	**(2)**	
or $W_1 = N + W_2$		W_1 = the estuarine outflow, W_2 - the sea inflow;
$S_1 = \frac{W_2 S_2}{W_1}$	**(3)**	S_1 and S_2 - salinity of an estuary outflow and sea inflow; S_E - salinity of the estuary;
$S_E = f(R, S_1)$	**(4)**	**T** - retention time (month, year);
$W_1 = N/(1 - \frac{S_1}{S_2})$	**(5)**	**V**= vol. of an estuary (equations 1-7).
$W_2 = N/(\frac{S_2}{S_1} - 1)$	**(6)**	S_1* and S_E* an accumulative salinity of an estuary in the case cumulative runoff depletion (e.g., 8 & 9); the equation 10 for impaired runoff.
$T = (1 - \frac{S_1}{S_2})V/N$	**(7)**	**"n"** = an amount of years of salt accumulation in the Delta-Bay ecosystem;
$S_1^* \mid_{i=1}^{n} = S_1 \pm \Delta S_1^*$	**(8)**	ΔS_1* and ΔS_E* are accumulative increment of salt for i = 1, 2, 3... **"n"** years.
$S_E^* \mid_{i=1}^{n} = S_E \pm \Delta S_E^*$	**(9)**	If the runoff **R** = O or less **P-E** then equations 11 underscored the cause substantial increase salinity of estuarine waters (12).
$W_1^* S_1^* = W_2^* S_2^*$	**(10)**	
$W_2^* > W_1^*$	**(11)**	In this case, the entropy will tend to reach stabilized maximum and estuarine properties will be transformed into an artificial harbor where $S_1^* \; S_2^*$
$S_2^* \geq S_E^* \geq S_1^*$ and $S_1^* \approx S_2^*$	**(12)**	

Figure 2. Relationship between (1) regulated Delta outflow for three moving months (April-May-June) and (2) commercial salmon catch in the Sacramento and San Joaquin Rivers. The salmon catch is based on a lag outflow period of 2 years; e.g., salmon catch for 1916 is based on outflow for 1912-1914.



From:	Michael Rozengurt
To:	Vinton, Joanne@DeltaCouncil
Cc:	secretary@resources.ca.gov; lwintemitz@tnv.org; rnorgraard@deltacouncil.ca.gov
Subject:	Letter to President Clinton (old one is well forgotten new one; Russian proverb)
Date:	Monday, February 20, 2012 12:37:54 AM

The Honorable William J. Clinton

President of the United States

The White House, Washington, DC 20050

Dear Mr. President:

We thank you for the giant environmental step your administration has taken in sponsoring the National Ocean Conference (NOC) in Monterey CA on June 11-12. This crucial forum will have lasting impact if you use the opportunity to make clear that there is a vital connection between a naturally functioning watershed and the sustainable riches of its coastal zone.

Over 500 billion dollars has been spent since 1970 to rid this nation of water pollution; at least as much will now be expended to improve the health and management of our watershed-coastal zone complex. It is still not well understood that watersheds and their coastal zones form a single complex ecosystem; damage to one reach is eventually seen in the other. We wish we could be at the June NOC to make this point. But as you gaze over Monterey Bay, where a huge river once cut a channel deeper than the Grand Canyon, be aware that all the natural aquatic ecosystems of California are in danger of disappearing along with their adjacent coastal one resources.

The MBNMS is not the only system in danger. Northern California is presently struggling to save the "broken delta" of the Sacramento-San Joaquin rivers, while planning to withdraw even more water to satisfy the contracted "needs" of agriculture, industry and a burgeoning population.

In the Southern California Bight, 26 major and some 150 minor waterways have been damned and depleted, leading to major declines in coastal resources. Massive efforts to severely reduce pollution coming from 15 million inhabitants and their industries have not brought concomitant resource recovery in this area. Similar water development schemes elsewhere have presented us with severe resource problems in the Colorado and Columbia river systems, Gulf of Mexico, and East Coast and Florida bays and estuaries. For too long we have failed to understand the nature of this link, and have blamed a multitude of other sins (habitat destruction, pollution, overfishing, and, now, even global warming) for the obvious decline in our sea's resources. As those bright fellows Sir Isaac Newton and Albert Einstein taught, you can't get something from nothing! Although

each new sin may compound our problems, without some remaining semblance of a naturally functioning watershed the coastal zone resources will continue to decline, costing our economy billions. Even the now protected Monterey Bay National Marine Sanctuary (MBNMS) will not survive, and this fact will not change much by further scientific studies of pollution, overfishing, or other concerns not related to the overarching problem of fresh water depletion. We have been looking in the wrong

place for the cause of the ocean's decline! It is time to focus on the critical link between watersheds and seas. It's the water that forged and strengthened this link over the past several thousand years.

Decades of careful study and experience has shown us this problem stems primarily from the cumulative effects of dam building and subsequent freshwater diversions to serve human needs. A practical limit is diversion of more than 25-30% of the average natural freshwater runoff . Exceeding this amount has denied coastal waters of billions of tons of sediments, nutrients, oxygen, and other trace materials.

These elements, along with the natural hydrological mixing and entrainment processes of Spring flushing, are essential to maintain even a small part of the formerly teeming coastal zone sustaining 90% of our most important fish and shellfish resources. Not every drop of water reaching the sea is wasted (contrary to the cries of water developers).

The long-term, cumulative effects of runoff depletion on the delta-estuary-bay-coastal complex have just begun to receive wider attention. Future work deserves an integrated system approach that can only be accomplished by the wonderfully diverse talents brought together for your NOC.

Please raise the bar by challenging them to work in concert with other estuarine and freshwater stake-holders to research, develop and manage lasting solutions for all future generations. These facts have long been apparent to us, are well documented

globally and are clearly seen in ecosystem destruction in the former Soviet Union, including a shriveled Aral Sea, salinized Azov Sea and 150 billion dollars in lost fishery catch in the Black Sea and Caspian.

Elsewhere in Asia and the Middle East, the water supply crisis has advanced to the stage where the looming issue is environmental security." This strategic aspect of water is now becoming more prominent in our daily news (e.g., A thirsty China may prove belligerent, Georgie Anne Geyer, Orange County Register, CA Opinion, May 15, 1998).

Mr. President, your trip west in June would be seen by us as a great success were you to call attention to the role played by runoff in maintaining the rich and abundant productivity of the nation's watershed ecosystem (river-delta-estuary-bay-coastal zone complex). Use this opportunity to announce initiatives to determine the appropriate division of this nation's fresh water, halting the cumulative effects that diversions have already had on formerly rich estuarine and coastal waters. Until watershed limits are determined in a comprehensive, integrated way we predict continued decline in renewable and other resources and further degradation in Delta and coastal water quality and living resources.

This fact will eventually result in even more serious consequences than just the "water wars" we are continually trying to avoid here in California. A strong federal presence in this business can counter some of the parochial

interests that continue to inhibit progress in understanding the bigger picture of the nature of water and its vital role in maintaining our priceless coastal zone.

Respectfully,

Irwin Haydock, Ph.D.; Aquatic Ecologist, Fountain Valley, CA;

Michael Rozengurt, Ph.D., P.H.; Oceanographer and Hydrologist, Huntington Beach, CA. (Together representing over 80 years of watershed-coastal zone science and management)

cc: Honorable Vice President, Al Gore

Kathleen A. McGinty, Chair, CEQ

Senator Barbara Boxer

Senator Diane Feinstein

Congressman Sam Farr

Congressman Dana Rohrabacher

(P.S. Separately, I will send some reviews of UNESCO's experts on the letter to President).

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From:	Michael Rozengurt
To:	Vinton, Joanne@DeltaCouncil
Subject:	Letter to Governor and Fig.
Date:	Monday, February 20, 2012 3:01:38 AM
Attachments:	ROZEMGURT.pdf

Privet from the recent past

----- Original Message -----

From: <mailto:rozengurt@earthlink.net> Michael Rozengurt

To: <mailto:keithc@deltacouncil.ca.gov> Keith Coolidge

Cc: <mailto:terry.macaulay@deltacouncil.ca.gov> Terry. Macaaulay

Sent: Thursday, September 09, 2010 8:56 PM

Subject: Letter to Governor and Fig.

Copy: Letter to Governor

FIG. TO: about multi-billion dollars water coveyance planning construction

Michael Rozengurt Ph.d., P.H. wrote to:

Arnold Schwarzenegger

Honorable Governor State of California

On June 20, 1980, Irwin Haydock (Ph.D. biology) and I (Michael Rozengurt, Ph.D., P .H. in the fields of oceanography and hydrology) sent a letter to California's then Governor Jerry Brown ,and subsequently spread it among numerous others officials as well as scientists of different entities of State of California (see, e.gttp://deltavision.ca.gov/docs/9_Comment_from_Irwin_Haydock_11-30-07.pdf)

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This two pages letter was based on almost 55 years combined experience and backed by many publications of Dr. Rozengurt as a principal investigator in the former U.S.S.R., concerning the effect of man's activities on environment of River – Delta –Estuary – Coastal sea ecosystems (over 80 publications, including several monographs – some available in the Library of Congress).

Note that a part of the above references were translated in 1981 by California's Dept. Water Resources and some fundamental conclusions were republished in English in "Water , Water Everywhere But Just so Much to Drink" in "Oceans" Magazine, September 1981 (an Editor and Publisher of this journal at that time was a grandson of President Roosevelt).

Note that in the above-mentioned letter, the following warnings were given to result if, with the help of a Peripheral Canal, there were increasing water withdrawals from Delta for transport to the South, which was the subject of discussion in the press of 1980 almost every day.

In short, at that time we wrote to Governor J. Brown

1. That accumulative reduction of runoff, especially in spring, of 25-30% or more percent of Normal, i.e. (the average over 55-60 years in concert with international method of hydrological statistic ,UNESCO), will lead to negative, in term of quality, transformation in regime characteristics of Delta - S.F. Bay ecosystem
2. Note that this process corresponds to Universal Laws of Thermodynamics and their derivative characteristic as Entropy. The latter is a sign of gradual, prospective demise of Deltaic ecosystem, provoke by intensive, i.e. more then the natural limit in water withdrawals — approximately 25-30%!
3. Further depletion spring and annual runoff will exacerbates degradation of physical and chemical features of habitat of Lower River – Delta – San Francisco Bay ecosystem within a decade or two decades.
4. Note that accompanying cumulative losses of sediment load, and gradual increases in salt intrusion and, therefore, led to insidious salinization of deltaic water, that negatively affect of water quality for decades. At the same time it will intensify light penetration, eutrophication, decrease dissolved oxygen, and dangerously chip away levee foundations.
5. Note that all of these and other factors will result in marked depletion of biological productivity and massive collapse of landings fish and shellfish.

In practice, numerous large rivers have demonstrated that if water diversion exceed statistically validated limit than runoff deprivation that gradually trigger the following mortal blow for river - delta ecosystem inter connection features, namely:

no water, no habitat, no fish or other resources.

Unfortunately, some in the environmentally naive political establishment of this development fully ignored this letter as well as the results cited in local and international publications (publications of 1920-1980, and later, and two book-length reports from CSUSF's Tiburon Center for Environmental Studies, being presented at State and numerous other Hearing of 1987,1988). Note that hydrological parts of reports and prognosis on River's wet or dry conditions were highly regarded in Review and presentation of Academian Luna Leopold, Professor Berkeley University.

Despite the facts that I emphasized that a “Peripheral Canal” was built in the Volga Delta in 1974 (for the same purpose as discussed in California's case), with a $4 billion dollar price tag (M. Rozengurt and J Hedgpeth, 1989, Revs.Aquatic Science, 1 (2: 337-362). Its operation in the Volga Delta has resulted in a mortal blow for both habitat and fishery resources of the Delta-North Caspian ecosystem.
Note that the late Mr.Randall L. Brown, DWR biologist from DWR's Kennedy administration, was sent to Russia in 1991 to meet some Delta Volga Administration to check my statements and writing about happen to be enviromental disaster - Volga Divider, or Peripheral Canal.

According his later personal sharing of facts, he found that my published statement about the Volga unfortunate adventure of billion rubles price tag corresponded to reality.
In addition, Mr. Brown showed Rozengurt (me) at the end of that summer his devastating report to Director Kennedy of DWR about environmental and economical role of Volga Delta Peripheral Canal in the entirely negative transformation of Volga Delta regime characteristics, and migration , spawning, and fishery.

Nowadays, I again urge you and State Administration to facilitate a more rational water policy based on statistically validated results of scientific investigation of runoff and fishery over 40 - 60 years (two book-length reports from CSUSF's Tiburon Center for Environmental Studies, 1987,1988):

1. California possesses only 28.5 MAF on average of unimpaired runoff over a perennial period (55- 60 years, in concert with UNESCO regulation) in the Sacramento - San Joaquin watershed. This amount determines entirely the survival of the Delta - San Francisco Bay and the State's precious coastal resources;

2. the Sacramento - San Joaquin rivers' spring runoff, the lifeblood of this river system, has already been reduced to 10 to 30% of what once was around 11 MAF, on average (spring unimpaired runoff as computed over 55 to 60 years)

3. Since 1955 the excessive water withdrawals have deprived the Bay over 600 MAF (million - acre-feet, or 720 cubic kilometers) of freshwater runoff or 100 and 500 times of the volumes of the Bay and Delta, respectively.

In addition, at the same time, millions of tons of organic and inorganic matter, suspended sediment, oxygen, and other components of Delta regime characteristics have been left behind the dams and in water conveyance facilities, and, therefore, have not reached Bay-Delta water body.

But historically, the any Delta is the heart (fig.) of river - estuarine ecosystem and the most suitable home for nursery and breeding ground for many commercially important species. In process of deltaic tributaries evolution , they have passed millions acre-feet water, saturated with organic and inorganic load from river watershed, and produced, circulated and reprocessed nutrient increment (about 70%) within their freshwater body. This have maintained the unique richness of delta at whole. Furthermore, the Delta outflow acts as a buffer zone to repel saltwater intrusion, and provide flushings the natural and human introduced pollutants. However, when subnormal, regulated wetness starts prevailing events, due excessive water diversion - myriads of negative features have been developed nearly simultaneously in Delta.

Among them, the salinization of Delta water body has occurred. Undoubtedly, salt intrusion into Delta when runoff has been reduced, is most insidious, the inverse of the runoff process. IF this development has persisted – This will put the end to water transferring to Contra Costa County and South California. Note that Contra Costa County had experienced this disaster in 1920-th,when runoff critically dropped due to natural drought.

That is why, any statement about "Restoration" of the Delta with the help of Peripheral Canal or other constructions under manifested of seasonal and annual runoff deprivation was, is, and will be environmental and economical dangerous fallacy! For "No One Can Get Something from Nothing, i.e. no runoff - no habitat- no living resources."

Unfortunately, the past and current incessant water development has negated these universal facts, and, therefore, made the system impounded. As result, almost despoliation of the Delta has occurred.

Therefore, the dissection of rivers by numerous dams and other water diversion systems has broke river continuum. As a result, the Sacramento river

runoffs have nothing in common with history of it evoltion.

That is why, all belies of the statements that have claimed that it is possible to restore historical habitats of impounded River - Delta - San Francisco Bay ecosystem have to be considersd as reduction ad absurdum.

Recomendation :

I dare to state that only a nuclear powered desalination plant (like operated in city of Shevchenco, Mangyshlak Penincula, Caspian sea, or other areas) built in the Bay area can safe the Delta from fresh water starvation and agonizing demise, for it can produce hundreds of thousand cubic meters(or millions of acro-feet) fresh water, that can be used to recharge water conveyance system as drought conditions may occur and concern over water availability increases. Note that today are over 7,500 desalination plants in operation worldwide.

Cordially,

M.Rozengurt, Ph.D., P.H.

(1045 N.Kings Rd.,#207,W.Hollywood,Ca.90069)

Cc.:

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"Do we reckon our whereabouts with economic statistics or earthworm sensibilities?" - Woody Tasch

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THE DELTA IS THE HEART OF THE ESTUARINE SYSTEM:

WILL IT SURVIVE?